ABSTRACT:

A device for scanning a first and second type of optical record carriers (2; 40) generates a first and a second radiation beam for scanning the first and second type of record carriers, respectively. The information layers (4; 42) of the first and second type of record carriers is scanned through transparent layers (3; 41) of different thickness. The first radiation beam (17) has a first wavelength and a first numerical aperture NA_1. The second radiation beam (46) has a different, second wavelength and an effective second numerical aperture NA_2 smaller NA_1. The rays of the second radiation beam having an NA smaller than NA_2 form a central sub-beam (48), the rays having a larger NA form an outer sub-beam (49). The device includes a non-periodic phase structure that does not affect the first radiation beam. The phase structure introduces an amount of spherical aberration in the central sub-beam (48). The phase structure is transparent for the central and outer sub-beam (48; 49). The introduced spherical aberration compensates the difference in spherical aberration caused by the difference in thickness of the transparent layer (3; 41) of the first and second type of record carriers (2, 40). To reduce the amount of stray light falling on the detection system (25) from rays in the outer sub-beam (49), the phase structure introduces an amount of defocus in the second radiation beam (17). The defocus displaces the focus of the central sub-beam with respect to the focus of the outer sub-beam, causing the intensity distribution of the central and outer sub-beam to split in two separate distributions. If the position and size of the detection system are properly chosen, the detection system will capture mainly rays from the central sub-beam and not from the outer sub-beam. Hence, the displacement of the foci allows spatial filtering in the plane of the detection system (25) of the desired and undesired rays of the second radiation beam.

Figure 1